



Time Series Analysis of Manufacturing Industry Labour Productivity and Economic Growth: The Case of Cameroon 1990-2019

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Abstract:

This research, conducted with meticulous rigor, aims to investigate the impact of labor productivity in the manufacturing industry on Cameroon's economy over the past 30 years (1990-2019). The study, which relies on robust data from the World Bank Development Indicators (2020) and the International Labour Organization Office (2020), employs multiple linear regressions and econometric analysis. The statistically significant findings reveal that increased labor productivity in the manufacturing industry leads to a rise in real GDP. However, the results also indicate that between 1990 and 2019, labor productivity had a positive but insignificant impact on economic growth in Cameroon. In light of these findings, the paper proposes policy implementations that could significantly influence labor productivity's role in Cameroon's economic development, offering a promising future for the country.

Keywords: Labour Productivity, Economic Growth, Manufacturing Industry, Gross Domestic Product, Foreign Direct Investment

Introduction

Labor productivity and economic growth are indicators and the lifeblood of a nation's competitiveness. Productivity is the relationship between quantity and output of input used to generate an output. Productivity could be used to measure the effectiveness and efficiency of utilizing resources toward the goal. Labor productivity is a divulging gauge of several economic indicators as it offers a dynamic measure of economic growth, competitiveness, and living standards within an economy (Simpao, 2018). The basic formula of labor productivity is the quotient of output over input, where labor input is usually measured in hours worked or dollars. In contrast, production is generally measured in units.

Manufacturing is described as an engine of growth and development in any country. Despite its inadequate natural resources and the crisis in the 1920s characterized by

hyperinflation, Germany has effectively and efficiently exploited the manufacturing sector, becoming the largest economy in Europe and the fourth in the world. Today, the manufacturing industry is a driving force determining a nation's economic health and efficiency. (Doctor & Campus, 2011). As A critical tool for economic growth and development, industrialization is primarily driven by modern societies' industrial sector. The manufacturing industry mainly serves as a channel for producing goods and services and generating income (Addo et al. (2017). However, this study's findings suggest that labor productivity's impact on economic growth in Cameroon is currently insignificant, which underscores the need for strategic policy interventions to enhance the role of the manufacturing industry in driving economic development in the country.

After its independence, Cameroon experienced strong economic growth with an average of 4% annual GDP growth. Between 2004 and 2008, the country reduced its public debt from 60% to less than 10%, resulting in more than \$ 3 billion in savings. In 2016, Cameroon's unemployment rate was about 3.47%, with one-third of the population below the poverty line under \$1.25 a day and an inflation rate of 2.5%. Since the 1980s, Cameroon has started to follow the IMF and World Bank programs, which encourage the privatization of state-owned industries to increase efficiency, productivity, and growth, thereby reducing poverty. Since then, she has promoted tourism and the major industries in Cameroon, including agriculture, mining, manufacturing trade, and transport.

There has been steady growth in the manufacturing industry in Cameroon since the late 20th century. The manufacturing industry was accounting for about one-fifth of the country's GDP. The manufacturing industry depends on transforming or processing agricultural products such as sugar refining, tobacco processing, cotton spinning textiles, and food processing. Some heavy industries include Edea Aluminum smelter, which imports most bauxite and smelts to finished products. Limbe's national refining company (SONARA) refined oil and petroleum through the national investment corporation. The government agency's role has significantly reduced since it adopted privatization in the 1990s. The Cameroon economy continues to encounter many challenges that are retarding economic growth, despite implementing the poverty reduction strategy paper (PRSP). Since November 2016, Cameroon's economy has been facing political instability (Anglophone crisis), which harms the whole economy.

The need for labor helps shift labor resources from the low-productive sector in agriculture and the informal sector to the more productive industrial sector segment. (Odero et al., 2018) She described the process as a transition from immaturity to maturity. As in Cameroon's case, an immature economy has much labor available in the agriculture and informal service sectors. Like any other industrial activity, Manufacturing creates an avenue for employment, boosts agriculture, and diversifies the economy while increasing foreign exchange earnings. Manufacturing helps a country to minimize the risk of high dependency on imports.

The industrial sector's contribution to GDP (Gross et al.) in Cameroon is below that of the tertiary industry, which results in structural problems. The Cameroon Ministry of Finance studied the competitiveness of manufacturing industries, with 95 enterprises in 13 branches. The result of this study shows that the unit costs of enterprises are considerably high. Input constitutes the main component of the general expenses of manufacturing industries (72.2%), then the cost of capital (10.1%), labor cost (9.2%), and taxes (MINFI). Again, Cameroon industrialists face smuggling, high taxes, unfair competition, corruption, and bad governance. With sound policies, the industrial sector can transform the economy from recovery to boom.

Therefore, this research aimed to examine the contribution/impact of the manufacturing sector labor productivity, output, Gross domestic fixed capital, and foreign direct investment to Cameroon's economic growth as the country's vision is to emerge by 2035. The concept has notable objectives.

Related Literature

Labour Productivity

The International Labour Organization defined labor productivity as the ratio between the output volumes measured by production and the corresponding volume of labor. The study calculated labor as follows:

$$\text{Labor productivity} = \text{GDP at constant prices} / \text{number of persons employed}$$

Productivity is defined as a balance between all factors of production that will give maximum output with minor efforts, division of labor, and time to create a more significant, practical, and valuable production (Samargandi, 2018).

The manufacturing sector's performance is below expectations and contributes less than 7 percent of the GDP (MINFI, 2008). The reason is that the manufacturing industry is poorly organized and not fully integrated with other economic sectors. Though the agricultural sector employs more labor, it lacks technical know-how and is less productive. The subsistence and informal nature make it difficult to know the actual contribution to the GDP. The food production sector experiences growth while the export crop production is declining. The service sector has been growing mainly due to commercial activities with no significant impact on value-added, as argued in GESP (2010:5-10). This growth leads to an unbalanced and obsolete pattern of the sector's contribution to GDP. Exposed to fluctuation in global prices of exported primary products, small domestic firms without any central opening to the sub-region and the international market are indicators of a non-competitive and weak economy.

Labour Productivity in the Manufacturing Industry

Manufacturing labor productivity reflects a firm's ability and capability to generate higher production or value-added. Productivity growth appears to have become one of the best and surest routes to development and poverty reduction, with the evidence that growth reduces poverty. Debates about the manufacturing sector's capability to improve the economy's growth imply that the industry has a significant effect and ability to fuel economic growth.

The high labor-product manufacturing sector's capability to improve the economy's growth activity in manufacturing firms means lower per-unit cost and, thus, the ability of the firm to match prices on the global market. Recently, there has been increasing interest in the literature on factors affecting labor productivity and productivity growth in a manufacturing firm. The result of studies at the firm level shows that factors such as research and development (R&D) expenditure of the firm, size of the firm, the level of information technology in the firm, and other factors are known as the essential factors affecting the productivity of labor in a firm. (Wan & Hyup, 2017). In analyzing changes in labor productivity by industry using the Korean Information Society Development Institutes 2017 productivity account, examine the trend of changes in labor productivity growth by industry during the pre- and post-crisis and the factors responsible for such changes. From their analysis and looking at the manufacturing

sector by the level of technology, witness their labor productivity grow at a slower pace since the global financial crisis, especially sectors of high-level (semi-conductor, displays smartphones) and medium to high (machines, automobiles, ship, and others) technologies which were primary key export industries. The main driver of the labor productivity growth in the manufacturing industry resulted from a slowdown in total factor productivity growth. Structural decomposition analysis shows that a significant factor behind the slowdown in real factor productivity growth in the manufacturing industry is a sharp slowdown in growth in output per unit input (labor and capital).

Economic growth and labor productivity Indicators

Economic growth, one of the government's macroeconomic objectives, refers to an increase in the country's productive capacity, capital and consumption goods, and real national income from efficiently utilizing scarce resources. Two types of growth are potential economic growth and actual growth. Economic growth is measured using the Gross Domestic Product (GDP) and the production possibility curve. For a nation or an economy to experience economic growth, the indicators are High employment rate, Stable Inflation, Wage growth, and higher industrial production (Heshmati, A., 2018). The following signals were noticed or witnessed.

Empirical studies have proven that most economies sustain long-term economic growth through increased worker productivity. Knowing how a nation uses its workers and other resources is very important. Labor productivity is the output each employed worker creates per unit of their time. Therefore, labor productivity is the most common indicator for measuring productivity: the output corresponding to input from the workforce. It can also be defined as the added value per hour worked. (Korkmaz & Korkmaz, 2017a).

Labor is determined by three factors: human capital, which comes from accumulated knowledge (education and experience), and the natural talent and expertise of the average individual in the economic process. The second determinant is technology. Technological change or technological advancement brings about inventions that advance knowledge and innovation, which involves using a new product or service. Lastly, physical capital includes the plant and equipment infrastructure, like good roads, which contribute to labor productivity—economies of scale that reduce manufacturing costs (Farooq et al., 2017). Improvement of machinery and equipment (capital productivity) will increase the quality of the labor force. (Jajri, 2010) discovered that capital stock and capital-labor ratio have an essential role in labor productivity and economic growth in the Malaysian economy, according to the data, which covers the period between the years 1981 and 2007. Though effective labor positively impacts economic growth, its contribution is less than physical capital's. (Korkmaz & Korkmaz, 2017b) The least-square Dummies variable (LSDV) method was used for China between 2000 and 2009. According to the result analysis, labor productivity has an essential impact on economic growth.

The Evolution of the Cameroon Manufacturing Industry

The Cameroon industrial base reflects three phases of a voluntarist industrial policy.

Protectionism marks the post-colonial period after independence from 1960 to 1976. Cameroon underwent industrialization to replace imports with local production by imposing tariff barriers and quantity restrictions. That encourages the emergence of local entrepreneurs, often under monopoly arrangements, with no requirement regarding improving competitiveness.

The "active" industrialization phase was driven by vigorous economic growth through petroleum production from 1977. Due to the fall in the price of oil and primary commodities, the economy in 1984 entered a recession, which was to last ten years. The income per head dropped almost 50 percent during that period.

The economic crisis revealed serious structural weaknesses: The industrial sector was poorly integrated and uncompetitive. Upheaval in the industrial landscape, marked by a fall in productive investment, increased social disintegration, and the emergence of an informal sector that threatened to engulf the formal manufacturing sector, left the industries weakened, vulnerable, and less competitive.

The resumption of growth has made a revival of Cameroon's industry possible. However, it has not taken off: In 1994, the CFA franc was devalued by 50 percent against the French franc, and reforms were embarked upon to liberalize trade and amend the indirect taxation system. Because of these measures, income per head rose for the first time since 1986. Large manufacturing enterprises, particularly those exporting, increased their output following the devaluation, but smaller firms, such as those in the informal sector, continued to fall (Auzina-Emsina, A., 2014).

Overview of Cameroon's manufacturing sector

The Cameroon manufacturing sector consists of various subsectors according to the national account classification. It is relatively diversified and employs many labor forces following the pre- and post-trade reform industry.

Table 1.0

Pre- and post-trade reform structure of Cameroon's manufacturing industries

Industry	Number of firms				Total Employment			
	Pre-reform		Post-reform		Pre-reform		Post-reform	
	Number	Share %	Number	Share %	Number	Share %	Number	Share %
Food products	185	44.79	52	28.89	20,490	31.38	24,526	46.21
Beverage and tobacco	13	3.15	10	5.56	8,359	12.80	2,797	05.27
Textiles	36	8.72	07	3.89	5,182	07.94	3,511	06.62
Wood and Furniture	68	16.46	35	19.44	9,316	14.27	7,957	14.99
Paper and printing	24	5.81	21	11.67	2,053	03.14	1,716	03.23
Chemical products	20	4.84	19	10.56	2,278	03.49	2,428	04.57
Rubber and plastics	15	3.63	11	6.11	11,265	17.25	6,935	13.07
Building materials	07	1.69	05	2.78	826	01.26	653	01.23
Basic metallurgy	03	0.73	03	1.67	1,364	02.09	1,080	02.03
	33	7.99	11	6.11	2,806	04.30	735	01.38
	06	1.45	03	1.67	754	01.15	200	0.38
	03	0.73	03	1.67	611	0.94	536	01.01
	413	100	180	100.0	65,304	100.0	53,074	100.0

Electrical
products
Transport
materials
Miscellaneous

Total
Manufacturing

Source: Njikam (2003)

Cameroon manufacturing consisted of 413 firms during the period of pre-trade reform. "Food," "wood and furniture," "textile and leather," and "electrical product" are the dominant sectors in terms of the number of firms, with the share of the number of firms varying between 8% and 45%. Cameroon's manufacturing sector consisted of 180 firms after trade liberalization, dominated by "food," "food and furniture," "paper and printing," and "chemical," with the number of firms representing 10.5% to 29% of the total. The post-trade reform witnessed a drop of 56.64% in manufacturing firms. The post-reform was catastrophic for sectors such as "textiles," "electrical," "transport material," and "wood and furniture," with a percentage drop in the number of firms being 80.56%, 66.67%, 50%, and 48.53%, respectively. The reform almost led to the disappearance of these sectors.

In terms of employment, the pre-trade reform shows that the dominant sectors were "food," "rubber and plastic," "wood and furniture," and "beverage and tobacco," with the percentage share of employment being 31.38%, 17.25%, 14.27% and 7.94% respectively. The post-trade reform witnessed a decline in the total labor force of 18.73%. However, sectors like "food" and chemicals reinforced their labor force. "Electrical product," "transport material," and "beverage and tobacco" suffered a dramatic drop of 73.31%, 73.47, and 66.54%, respectively.

Empirical literature review

Several studies used time-series data for 32 years, from 1981 -to 2013, in Nigeria's economic growth from a Kaldorian perspective, showing that manufacturing production positively and significantly affects Nigeria's economic development. Still, its production is weak to spur increased growth. The study employed Real GDP as the dependent variable and index of manufacturing production (IMP); Gross fixed capital formation (GFCF), labor force (LF), inflation rate (INFL), and Exchange rate (EXRT) as the independent variable. She analyzed the data obtained using the ordinary least square method. (Rioba, 2015).

Another study, using the same Kaldor approach, was carried out on the impact of the manufacturing sector on Ethiopia's economic growth. (Ududechinyere et al., 2018)The researcher used time-series data from 1980 to 2010. Real GDP is the dependent variable in his work while manufacturing sector output, manufacturing number of employments, and labor productivity in the manufacturing sector are the independent variables. The findings show that a unit change (variation) in the manufacturing sector increases economic growth by 42 percent. Hence, higher growth in the manufacturing industry can have multiple impacts on Ethiopia's national economy (Cantore N. et al., 2017).

Using the panel unit root test, the researcher studied the relationship between labor productivity and economic growth in OECD countries (Belgium, Germany, Spain, France,

Italy, Finland, and the United Kingdom for seven years, i.e., from 2008 to 2014 (Korkmaz & Korkmaz, 2017b). The results reveal a long-run equilibrium relationship between labor and economic growth for seven years. Also, the causality test points out a unidirectional causality relationship between economic growth and labor productivity. The result supports that labor productivity is better in countries with economic development.

Another study explored the impact of labor productivity on economic growth in South Africa and Mauritius using the Cobb-Douglas production function relating output Y to capital (K) and Labour (L) (Zulu & Banda, 2015). Their findings suggest that both countries (South et al.), proxies for investment in physical capital, strongly affect labor productivity and economic growth.

A study assessed the magnitude and direction of labor in the manufacturing sector of ECOWAS countries using panel data analysis from 1990 to 2019 (Ogundipe & Olarewaju, 2020). According to the fixed-effect model, labor productivity is significant and exerts an elastic influence on the manufacturing value added (MVA). Their findings show that a 1% increase in labor productivity results in a 36.4% increase in manufacturing output.

Methodology

The research locale of this study is in Cameroon. Cameroon is located between the west and central Africa. It shares boundaries with Nigeria to the North, Chad and the Central Africa Republic to the south and east, and the south by Gabon and Equatorial Guinea. The research design is descriptive and analytical. The data consists of annual observations on growth (GDP) and manufacturing output proxy as Manufacturing value-added, labor productivity, Gross domestic fixed capital formation, and foreign direct investment for 30 years (1990-2019). The study focused on the time series analysis of labor productivity in the manufacturing industry and economic growth in Cameroon. It will explain how variables (dependent and independent) will be measured, how data was collected, and the decision rule to follow in data analysis. This research utilized secondary data from related online articles, journals, statistical tools such as correlation coefficient, coefficient of determination, and software package SPSS, which is helpful or good for result interpretation. The data was collected online by exploring the World Bank Development indicator's database and International Labor Organization (ILO) data explorer for 30 years.

The research employs model specification in simple mathematical form and the determination of the economic model's coefficient's numerical value to proxy economic growth as the dependent variable while manufacturing output and labor productivity, gross domestic fixed capital formation, and foreign direct investment as the independent variable. The ordinary least square regression model is used to estimate the explanatory variable's coefficient to test the influence of the independent variable on the dependent variable.

From Kaldor's first law, there is a positive relationship between manufacturing output and economic growth. It is, therefore, implied that Manufacturing is the engine of growth. This equation is presented below:

$$GDP = a_1 + b_1 g_m \dots \dots \dots \text{equation 1}$$

Where,

g represents the growth of the total output

g_m represents manufacturing output

The subscript indicates the growth throughout the study.

From the Kaldor second law or Verdoorn law, a linear relationship between labor productivity and output growth:

$$P_j = C_i + b_i q_i \dots \dots \dots \text{equation 2}$$

Where P and q are the growth rate of manufacturing labor productivity and output, respectively

These two are incorporated into the model and can be specified in the form expressed below.

$$GDP = f(MO + LP + GDFCF + FDI)$$

Where GDP = Gross Domestic product

MO = Manufacturing output (proxy as manufacturing value added)

LP = labor productivity

GDFCF = gross domestic fixed capital formation

FDI = foreign direct investment

Stating the relationship mathematically, we therefore have

$$GDP = \beta_0 + \beta_1 MO + \beta_2 LP + \beta_3 GDFCF + \beta_4 FDI$$

Stating the relationship in the econometric model, it becomes

$$GDP = \beta_0 + \beta_1 MO + \beta_2 LP + \beta_3 GDFCF + \beta_4 FDI + \hat{\epsilon}$$

$\hat{\epsilon}$ = is the error term

B_0 is the constant intercept showing the GDP level when the explanatory variable is zero.

To examine the extent of serial correlation between the variables, some criteria, such as correlation coefficient, coefficient of determination (R^2), T-test, and F-test, are used.

Discussion

The extent of the contribution of labor productivity in the manufacturing industry to the economic growth of Cameroon

According to the World Database 2020, labor productivity trends in Cameroon fluctuated from 1990 to 2019. This fluctuation is due to the country's economic, social, political, and technological environment, which has brought about progression and regression over the past 30 years.

The following graph and table represent labor productivity and economic growth in Table 4.0.

The time series data below is used to plot a graph showing the trend of real GDP growth rate and labor productivity in manufacturing in Cameroon for the past 30 years (1990 -2019)

Table 4.

The trend of labor productivity and real GDP of Cameroon for the past 30 years (1990-2019)

Year	RGDP	LPM
1990	-6.100	NA
1991	-3.800	NA
1992	-3.100	-8.4
1993	-7.900	12.3
1994	2.100	2
1995	3.500	.47
1996	4.400	-4.2
1997	5.2	-2.6
1998	4.500	7.1
1999	4.300	5.6
2000	3.600	-2.4
2001	4.400	2.42
2002	4.2	.5
2003	4.6	-.9
2004	6.8	-5.57
2005	2	-3.7
2006	3.5	-4.8
2007	4.9	-20.1
2008	3.5	.54
2009	2.2	11.5

	2010	3.4	10	
	2011	4.1	-6.7	
	2012	4.5	11.9	
	2013	5.4	1.5	
	2014	5.9	-1.5	
	2015	5.7	4.5	
	2016	4.6	2.8	
	2017	3.5	1.7	
	2018	4.1	-4.5	
Where	2019	3.8	.25	RGDP = the actual
Source: World Bank Development Indicator and Ilostat Explorer ILO-modelled estimates				
gross				domestic product

LPM = labor productivity in Manufacturing

NA = not available

Table 4.0 depicts a cross-section of time-series data collected to illustrate a graph showing the trend (movement) between growth rate and labor productivity in Manufacturing. Real growth rate and labor productivity in Manufacturing are represented on the y-axis, while the years are on the X-axis.

From Figure 4, the trend indicates that in 1992, the labor productivity growth rate in the manufacturing industry in Cameroon was negative (-8.4%). It was accompanied by negative economic growth from 1990 to 1993. The growth rate was -6.1% and -7.9%, respectively. The negative growth resulted from the financial crisis the country faced in 1986. The real per capita gross domestic product fell by more than 60% from 1986 to 1994. It led to reduced government expenditure and drastic cuts in civil servant salaries. The International Monetary Fund (IMF) introduced devaluation to wipe out the persistent trade deficit and remove Cameroon from the crisis. With the depreciation of the FCFA currency in 1994, Cameroon was recovering from the problem with a growth rate of 2.1%. The labor productivity growth rate in the manufacturing industry also witnessed growth from 1993 to 1995.

For the past eleven years (1994 to 2004), Cameroon has witnessed steady progressive growth from 2.1% to 6.8%, the highest growth rate for the past thirty years.

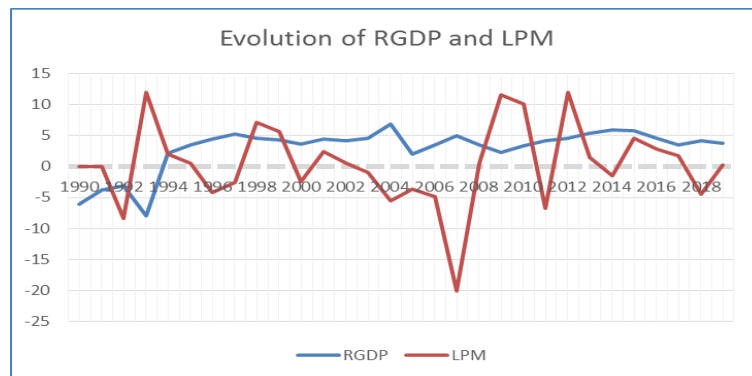
From 2003 to 2007, labor productivity growth in the manufacturing industry was negative. According to the Ministry of Finance findings, the negative growth rate was due to the high cost of capital (10%) and labor (9.2%) following the study on manufacturing industries' competitiveness with 95 enterprises in 13 branches.

From 2014, labor productivity growth in Manufacturing started to witness regressive growth (2.8% to .25%). It resulted from armed conflict in the two English-speaking regions with a frequent ghost town. The implications due to political instability are the rise of arms trafficking, leading to numerous killings and school boycott strategies. Between February 2017 and May 2018, at least 42 schools were attacked, two principals kidnapped, and three teachers killed (source: Baseline researcher; education in crisis in the Anglophone region. The declaration of a ghost town in two English-speaking regions by Anglophone leaders based in the diaspora has caused real GDP to fall or contract by 2.4 % in 2020 compared with 3.7% in 2019, given that 60% of Cameroon's GDP is from these two regions naturally blessed with

fertile soils and mineral deposit. (Source: Cameroon economic outlook 2021 /Africa development bank)

Figure 4.

Graphical representation of labor productivity in Manufacturing and actual gross domestic product



Correlation between the labor productivity in Manufacturing and economic growth in Cameroon

Table 4 shows that Pearson's correlation coefficient (r) is .283. Since r is a positive value, increasing labor productivity in the manufacturing industry will increase real GDP. The SPSS (r) result indicates a correlation but a low degree (weak relationship) between labor productivity in Manufacturing and economic growth. Hence, the impact of labor productivity on economic growth in Cameroon during the review was insignificant. It affirmed the study (Auzina-Emsina, 2014) – on labor productivity, economic development, and global competitiveness in the post-crisis period, which found a weak or no relation between labor productivity and economic growth in the pre and the first phase of the post-crisis period. As such, the increase in labor productivity during the crisis is an essential driver of the economy after a period.

Table 4.*Pearson Correlation coefficient Analysis between labor productivity and real GDP*

		Correlations		
		Real Gross Domestic Production	Labour Productivity in the Manufacturing Industry	MANU VALUE ADDED % of GDP
Real Gross Domestic	Pearson	1	.283	.056
	Correlation		.137	.769
	Sig. (2 Tailed)	30	29	30
	N			
Labor Productivity in Manufacturing	Pearson	.283	1	.472**
	Correlation	.137		.010
	Sig. (2 Tailed)	29	29	29
	N			
MANU VALUE ADDED % of GDP	Pearson	.056	.472**	1
	Correlation	.769	.010	
	Sig. (2 Tailed)	30	29	30
	N			
GDFCF % of GDP	Pearson	.763**	.259	-.181
	Correlation Sig.	.000	.176	.338
	(2 Tailed)	30	29	30
	N			
FDI % of GDP	Pearson	.474**	.388*	-.104
	Correlation Sig.	.008	.037	.583
	(2 Tailed)	30	29	30
	N			

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Since $8.034 > 2.975$, this shows that the explanatory variables in the model jointly influence the dependent variable (real GDP). The F statistic offers reliable proof of the overall significance of the model because the calculated F with the value of 8.034 is greater than the critical F, which is 2.975 at a 5% significance level, therefore, implies that at least one of the variables in the model is statistically significant. However, the probability of the calculated F being 0.0000 and, of course, less than a 5% level of significance further supports the overall importance of the model.

T-statistics is used to test for the significance of individual parameters used in the model, which showed that the variable has a significant effect on real GDP ($t_{\alpha 0.05/2} (3, 26) = 2.056$)

Table 5.*Testing the significance of the variables.*

Variables	t-calculated	Critical value	Conclusion
c	-3.755	± 2.056	Reject H_0
MVA	.840	± 2.056	Accept H_0
LPM	.205	± 2.056	Accept H_0
GDFCF	4.811	± 2.056	Reject H_0
FDI	-.481	± 2.056	Accept H_0

Looking at Table 5, GDFCF, including constant terms, significantly influences Cameroon's gross domestic product. In contrast, the influence of manufacturing value added (MVA), labor productivity in Manufacturing (LPM), and foreign direct investment (FDI) are statistically non-significant within the period under review (1990-2019).

Hence, the absolute t-value of (4.811) is greater than ± 2.056 and is statistically significant.

The observed absolute t-values of MVA (.840), LPM (.205), and FDI (-.481) are less than ± 2.056 and statistically non-significant. It, therefore, implies that the variables do not account for changes in real GDP. Consequently, the variable cannot be relied upon for a reliable forecast or proper explanation of changes in the real GDP.

More so, the result in **Table 5** reveals that foreign direct investment does not significantly affect Cameroon's economic growth. According to the outcome of the t-test, foreign direct investment does not substantially affect Cameroon's economic growth.

Table 6.*The Coefficients of the estimated variables*

	Coefficients				
Model	Unstandardized Coefficients		Standardized Coefficient	t	Sig.
	B	Std. Error	Beta		
(Constant)	-24.672	6.570		-3.755	.001
MANU VALUE ADDED % of GDP	.247	.294	.146	.840	.409
Labor Productivity in Manufacturing	.001	.005	.038	.205	.839
GDFCF % of GDP	1.077	.224	.810	4.811	.000
FDI % of GDP	-.237	.492	-.481		.635

The findings in this study affirm the assertion of Kaldor's second theory, also known as Verdoorn's law, that there is a positive causal relationship between output and labor productivity in Manufacturing. The work supports this. (Ogundipe & Olarewaju, 2020) Assess the magnitude and direction of labor in the manufacturing sector of ECOWAS countries using panel data analysis from 1990 to 2019. According to the fixed-effect model, labor productivity is significant and exerts an elastic influence on the manufacturing value added (MVA). The

evidence from their findings shows that a 1% increase in labor productivity results in a 36.4% increase in manufacturing output. The result from **Table 6** shows that in Cameroon, there is a positive relationship between manufacturing output proxy as manufacturing value-added and economic growth.

Table 6 shows that Gross domestic fixed capital formation positively correlates with the actual gross domestic product and conforms to its prior expectation. Consequently, a percentage increase in gross domestic fixed capital formation will lead to a 1.077% increase in Cameroon's economic growth.

Table 6 shows a negative relationship between foreign direct investment and real GDP and conforms to its prior expectation. Hence, a percent increase in foreign direct investment will lead to a .237% fall in Cameroon's economic growth.

The correlation of labor productivity, Manufacturing value-added, gross domestic fixed capital formation, and foreign direct investment.

Table 7.

The correlation of labor productivity, Manufacturing value-added, gross domestic fixed capital formation, and foreign direct investment.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.757 ^a	.572	.501	2.187725

a. Predictors: (Constant), FDI % of GDP, MANU VALUE ADDED % of GDP, GDFCF % of GDP, Labour productivity in Manufacturing.

1. Correlation coefficient (R) of labor productivity, Manufacturing value-added, gross domestic fixed capital formation, and foreign direct investment. The ordinary least squares result shows a correlation coefficient of .757, implying a strong relationship between the dependent and independent variables.

2. Coefficient of determination (R²) of the model.

The result shows that the coefficient of determination is .572, implying that the estimated model has a moderate goodness fit. Hence, the mix predictors in the model, on average, account for about 57.2% of changes in Cameroon's real GDP, while the error term accounts for the remaining 42.8% of the variation in real GDP.

3. Descriptive statistics

Table 8.
Descriptive statistics

		Statistics			
		Real Gross Domestic Production	Labor Productivity in Manufacturin g	MANU VALUE ADDED % of GDP	GDFCF % of GDP
N	Valid	30	29	30	30
	Missing	0	1	0	0
Mean		2.92667	1113.26897	15.59667	21.33667
Median		4.10000	1126.50000	15.10000	22.45000
Mode		3.500	1162.200	14.200 ^a	22.600 ^a
Std. Deviation		3.488694	105.047190	1.819337	2.412537
Variance		12.171	11034.912	3.310	5.820
Skewness		-2.050	-.823	.047	-1.297
Std. Error of Skewness		.427	.434	.427	.427
Kurtosis		3.603	.360	-1.177	1.412
Std. Error of Kurtosis		.833	.845	.833	.833
Range		14.700	412.100	6.000	9.900
Minimum		-7.900	863.400	12.200	14.300
Maximum		6.800	1275.500	18.200	24.200

Table 8 shows that Cameroon has a mean growth rate of 2.92% with a standard deviation of 3.488. It implies that the data set for real GDP is widely spread from the mean. Labor productivity in Manufacturing (LPM) registered a mean of 1113.26897 and a standard deviation of 105.04, meaning the data set for labor productivity in Manufacturing is closer to the norm. Manufacturing value added (MVA), gross domestic fixed capital formation (GDFCF), and foreign direct investment (FDI) registered a mean of 15.59, 21.3, and 1.25, respectively, with a standard deviation of 1.819 for MVA, 2.41 for GDFCF, and 1.17 for FDI. These three variables show that the data set is closer to the mean.

Except for the highly skewed real GDP, the remaining variables are moderately skewed because the skewness value lies between ± 1 and ± 0.5 . The Manufacturing value-added is skewed to the right because the mean exceeds the median. The remaining three variables are moderately skewed to the left because their mean is less than the median.

The real GDP kurtosis value is 3.60, greater than 3. It implies a platykurtic distribution with the data set widely spread from the mean. The remaining variables are labor productivity in Manufacturing, Manufacturing value-added, gross domestic fixed capital, and foreign direct investment, which is leptokurtic distribution as their kurtosis value is less than 3.

From Table 4, the result shows that Pearson's correlation coefficient (r) for Manufacturing value-added is .056 since r is positive, which implies that an increase in Manufacturing value-added will lead to a rise in real GDP. The result provided by SPSS indicates a correlation but in a weak state (weak relationship) between actual gross domestic product and manufacturing

value-added. Hence, the impact of manufacturing value-added on economic growth was statistically insignificant at the time of review. It is, therefore, implied that the Manufacturing value-added does not explain changes in Cameroon's real GDP.

From Table 4, the result shows that Pearson's correlation coefficient (r) for gross domestic fixed capital formation is 0.76. It implied that an increase in gross domestic limited capital formation would increase real GDP. The SPSS $+(r)$ result indicates a positive correlation between gross domestic fixed capital formation and economic growth. Hence, the impact of gross domestic fixed capital formation is statistically significant. Gross domestic fixed capital formation explains Cameroon's fundamental GDP changes.

Table 4 shows that Pearson's correlation coefficient (r) for foreign direct investment is 0.618. Since r is positive, increasing foreign direct investment will increase real GDP. The SPSS (r) result indicates a positive and strong correlation between foreign direct investment and economic growth. Hence, the impact of foreign direction on economic growth was statistically significant during the review, which means that foreign direct investment explains the changes in Cameroon's real GDP.

Conclusion and Recommendation

The study concluded that the global financial crisis significantly impacts the devaluation of labor productivity in Cameroon manufacturing, which generally affects GDP. The study proved a positive relationship between labor productivity in Manufacturing and economic growth (output). Therefore, it agrees that labor productivity is significant and exerts an elastic influence on the manufacturing value added (MVA). The findings show that the insignificant effect of Manufacturing value-added is the increase of dependence on imports rather than the export rate. Labor productivity has a positive relationship because of the natural factors that are physical, geographical, and cheap labor, but it has no significant effect on economic growth. Gross domestic fixed capital formation has a positive and vital contribution to the economic development of Cameroon due to the low interest rate to promote investment for the expectation of future profitability.

Finally, the negative relationship of foreign direct investment is caused by poor infrastructure, low level of technology, weak rule of law, and continuing inefficiencies of the extensive parastatal system in the vital sector.

Based on its findings and conclusions, this research study recommends that the Cameroon government take serious action to create a policy to improve working conditions, including the working environment, wages, and education.

Finally, the study recommends further study of the other factors in labor productivity in the manufacturing industry that contribute to economic growth.

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